

APL IDIOMS

(8 page version)

apl idioms -- structural

`((vector\vector)=\pvector)/vector`

A select unique elements

`(1,1+vector≠1pvector)/vector`

A select unique elements from a sorted vector

`(1 1Q<\matrix≠\matrix)/matrix`

A select unique rows

`(1,1+V/matrix≠1matrix)/matrix`

A select unique rows from a sorted matrix

`(1⌈2+parray)parray`

A make a row-oriented matrix

`(1⌈2+parray)parray`

A make a column-oriented matrix

`((pvector),1)pvector`

A make a 1 column matrix from a vector

`(1,pvector)pvector`

A make a 1 row matrix from a vector

`((0 1×pmat2)⌈pmat1)↑mat1),[1]
((0 1×pmat1)⌈pmat2)↑mat2`

A concatenate 2 matrices along dimension 1

`((1 0×pmat2)⌈pmat1)↑mat1),[2]
((1 0×pmat1)⌈pmat2)↑mat2`

A concatenate 2 matrices along dimension 2

`,vec1,[⊖io+.5] vec2`

A interleave 2 vectors of same length

`(lo-1)+11+hi-lo
lo-⊖io`

A integers between lo and hi limits

`(vec1,vec2)[⊖bool]`

A mesh 2 vectors according to boolean vector

`x,[⊖io-(⌈2p⌈/2>(ppx),ppy)/.5 1] y`

A concatenate/laminate 2 arrays to form rows

`x,[⊖io+(⌈2p⌈/2>(ppx),ppy)/.5 1] y`

A concatenate/laminate 2 arrays to form columns

`(,b,[1.5] 1)/,b,[1.5] ~b`

A generate expansion vector from boolean vector

apl idioms -- sorting and searching

vector[*Δ**vector*]

A sort a vector

matrix[*Δ*(1+*ρ**key*)*Δ**key*\i*matrix*;]

A sort the rows of a matrix

*⊖**io*+*+/**^**~matrix1**^**.*=*matrix2*

A first index of rows in a matrix

(*vector*=*scalar*)/*ρ**vector*

A all indices of a scalar in a vector

⊔/*vector*\i*elements*

A first occurrence of several elements in a vector

(*scalar*∈*vector*)×*vector*\i*scalar*

A first occurrence of or zero

(*vector*≠*scalar*)*⊔*1

A first index in vector which is not scalar

vector[*Δ**key*\i*vector*]

A sort vector in order specified by key

apl idioms -- formatting

$(+/\wedge\backslash' '=array)\phi array$	A left justify
$(1-(array=' ') \perp 1)\phi array$	A right justify
$width \uparrow ((L-/.5 \times width, \rho text) \rho ' '), text$	A center
$(\vee\backslash' '#text)/text$	A remove leading blanks
$(\phi \vee\backslash' '#\phi text)/text$	A remove trailing blanks
$((text \neq ' ') \vee text \neq 1 \phi text)/text$	A remove duplicate, adjacent blanks
$((2 \times \rho text) \rho 1 \ 0) \backslash text$	A double space text

$0 = pvector$

$0 \in parray$

$\wedge/, array \in 0 \ 1$

$\wedge/, array = [array$

$0 = 1 \uparrow 0 parray$

$\wedge/elements \in set$

$\vee/elements \in set$

$\wedge/vector1 = vector2$

$vector1[\wedge vector1] \wedge. = vector2[\wedge vector2]$

$\wedge/[axis] \ array = [\ [axis] \ array$

$\wedge/[axis] \ array = [\ [axis] \ array$

A empty vector?

A empty array?

A boolean array?

A integer array?

A numeric array?

A all members of a set?

A any members of a set?

A 2 vectors identical?

A 2 vectors permutations
of each other?

A array in ascending order
along certain dimension?

A array in descending order
along certain dimension?

apl idioms -- boolean shifts

	$x \leftarrow$	0 1 0 1 1 0 0 1 0 1 1 1 0 0 0 1	
$x \wedge^{-1} \uparrow 0, x$		0 0 0 0 1 0 0 0 0 0 1 1 0 0 0 0	A one and previous is one
$x \wedge \sim^{-1} \uparrow 1, x$		0 1 0 1 0 0 0 1 0 1 0 0 0 0 0 1	A one and previous is zero
$x \wedge 1 \uparrow x, 0$		0 0 0 1 0 0 0 0 0 1 1 0 0 0 0 0	A one and next is one
$x \wedge \sim 1 \uparrow x, 1$		0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 0	A one and next is zero
$(\sim x) \wedge^{-1} \uparrow 0, x$		0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0	A zero and previous is one
$\sim x \vee^{-1} \uparrow 1, x$		0 0 0 0 0 0 1 0 0 0 0 0 0 1 1 0	A zero and previous is zero
$(\sim x) \wedge 1 \uparrow x, 0$		1 0 1 0 0 0 1 0 1 0 0 0 0 0 1 0	A zero and next is one
$\sim x \vee 1 \uparrow x, 1$		0 0 0 0 0 1 0 0 0 0 0 0 1 1 0 0	A zero and next is zero
$x \neq^{-1} \uparrow (1 \uparrow x), x$		0 1 1 1 0 1 0 1 1 1 0 0 1 0 0 1	A previous bit is different
$x =^{-1} \uparrow (\sim 1 \uparrow x), x$		0 0 0 0 1 0 1 0 0 0 1 1 0 1 1 0	A previous bit is same
$x \neq 1 \uparrow x, \sim^{-1} \uparrow x$		1 1 1 0 1 0 1 1 1 0 0 1 0 0 1 0	A next bit is different
$x = 1 \uparrow x, \sim^{-1} \uparrow x$		0 0 0 1 0 1 0 0 0 1 1 0 1 1 0 0	A next bit is same

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 $\wedge \backslash x$        $x+1$  1 1 0 1 1 0 1 0 0 0 1
                1 1 1 0 0 0 0 0 0 0 0 A ones until first zero from left

 $\sim \wedge \backslash x$      $x+1$  1 1 0 1 1 0 1 0 0 0 1
                0 0 0 1 1 1 1 1 1 1 1 A ones after first zero from left

 $\vee \backslash y$        $y+0$  0 0 1 0 0 1 0 1 0 0 1
                0 0 0 1 1 1 1 1 1 1 1 A zeros until first one from left

 $\sim \vee \backslash y$      $y+0$  0 0 1 0 0 1 0 1 0 0 1
                1 1 1 0 0 0 0 0 0 0 0 A zeros after first one from left

 $< \backslash z$         $z+0$  0 1 1 1 0 0 1 0 0 1 0
                0 0 1 0 0 0 0 0 0 0 0 A first one from left

 $\phi \wedge \backslash \phi x$   $x+1$  1 1 0 0 1 1 0 0 1 1 1
                0 0 0 0 0 0 0 0 0 1 1 A ones until first zero from right

 $\phi \sim \wedge \backslash \phi x$   $x+1$  0 0 1 1 0 0 1 1 1 1 1
                1 1 1 1 1 1 0 0 0 0 0 A ones after first zero from right

 $\phi \vee \backslash \phi y$   $y+1$  1 1 0 0 1 0 1 0 0 0 0
                1 1 1 1 1 1 1 0 0 0 0 A zeros until first one from right

 $\phi \sim \vee \backslash \phi y$   $y+1$  1 1 0 0 1 0 1 0 0 0 0
                0 0 0 0 0 0 0 0 1 1 1 A zeros after first one from right

 $\phi < \backslash \phi z$    $z+0$  0 1 0 0 1 1 1 0 0 0 0
                0 0 0 0 0 0 0 1 0 0 0 A first one from right

 $\neq \backslash v$        $v+0$  1 0 0 0 1 0 0 1 0 1 0
                0 1 1 1 1 0 0 0 1 1 0 A boolean finite state machine

 $v \vee \neq \backslash v$   $v+0$  1 0 0 0 1 0 0 1 0 1 0
                0 1 1 1 1 0 0 1 1 1 0 A ones and ones between ones

 $(\sim v) \wedge \neq \backslash v$   $v+0$  1 0 0 0 1 0 0 1 0 1 0
                0 0 1 1 1 0 0 0 0 1 0 A ones between ones

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apl idioms -- numerical

matrixx(ρmatrix)ρvector

A multiply vector times
rows of matrix

matrix × *Q*(*pmatrix*) *pvector*

A multiply vector times
columns of matrix

(+/[*axis*] *matrix*)+(*pmatrix*)[*axis*]

A average along specified
axis

array-0,[*axis*] (-*axis*=1 *pparray*)+*array*

A successive first differences
along specified axis

1|*array*

A fractional part of number

0 1|*array*

A split integer and fractional
part of numbers

1+|*base*@*number*

A number of digits needed to
represent number in base

(10**n*)|*number*

A keep *n* digits from right

|*number*+10**n*

A delete *n* digits from right

|.5+*numbers*

A round to nearest integer

(10*-*n*)×|.5+*numbers*×10**n*

A round to *n* digits right
of decimal point

apl idioms -- object generators

(*n*,*n*)*p*1,*n**p*0

A identity matrix

(1*n*)*o*..*n*

A upper triangular matrix

$(1n) \circ . < 1n$

$integer\Delta vector \circ . \geq 1 \uparrow / integer\Delta vector$

$integer\Delta vector \circ . \geq \Phi 1 \uparrow / integer\Delta vector$

$(2*n) \top 0, 1^{-1+2*2*n}$

A lower triangular matrix

A prefix 1's

A suffix 1's

A truth table for n variables